detailed information than is to be found in general texts on physical biochemistry. While it is perhaps too expensive for widespread personal purchase, it certainly deserves a place in any biochemical library, both for teaching and research purposes.

G.C.K. Roberts

Cell Ageing and Cell Death

Society of Experimental Biology Seminar Series 25

Edited by I. Davies and D.C. Sigee

Cambridge University Press; Cambridge, 1984

362 pages. £22.50

This volume deals with an important topic: the relationship between cell death during ageing and cell death in a variety of other biological situations, in both plants and animals. Unfortunately, as is often the case with published proceedings of conferences, the volume lacks cohesion. Instead of providing information and critical discussion relevant to the central theme, it simply lumps together diverse phenomena under one title, for example, the ageing of cultured human cells, cell death in plants invaded by pathogens, in the differentiation of xylem or in leaf senescence, and programmed cell death in chick limb development. The Editors try and pull the many loose ends together in a short concluding section, but they are not successful in this. Franks' even briefer Introduction makes several important points, but what is really needed is a unifying introductory commentary which clearly explains the important similarities and the differences, not only between cell ageing and cell death, but also between the various biological situations which are discussed.

Most workers would agree that the many outward manifestations of the ageing process are due either to the failure of cells to maintain normal functions, or to cell death. However, it is far from clear whether cell death in ageing is related to or is totally different from the programmed cell death that occurs during development and differentiation. Some authors, for example Lockshin and Zakeri-Milovanic, simply assume the mechanism of cell death in all situations is much the same, which is surely a very extreme view. The term apoptosis is generally used for programmed cell death, and Bowen in the longest contribution reviews the variety of changes seen in animal tissues. However, to my knowledge there is no good evidence that apoptosis is an important component of natural ageing.

Many of the contributions would have been greatly improved if they had made clearer the severe limitations of current knowledge; there is a tendency to use long words and references as a cloak for ignorance. Much of what is known about programmed cell death is descriptive, with histology still providing the most information. The beginnings of biochemical approaches have been made, but there are almost no molecular studies of any standing. Cell ageing usually deals with populations and is more concerned with the failure of cell proliferation; again, in spite of innumerable studies, the underlying mechanism remains obscure.

It is a pity that other authors could not have taken Micklem's contribution on the haematopoietic system as a model, since he clearly reviews the experiments which have so far been done, presents the alternative interpretations which can be offered, and draws the proper conclusion that we are still in a state of ignorance about the significance of cell ageing in this system. The well documented article on cell death during limb

development by Hinchcliffe and Griffiths is also valuable. Very specific cell death has been pinpointed in the development of a nervous system of nematodes. It is unfortunate that this work is neither described or even referred to, as it perhaps holds out one of the best hopes for a genetic and molecular understanding of the mechanisms of cell suicide. Another important area, discussed briefly by several of the contributors, is cell death in tumours. The balance between stem cell proliferation (metastasis) and cell death is crucial, because it determines the difference between malignancy and regression.

Finally, a book such as this benefits from a comprehensive index, but the one produced is not only rather incomplete, but also inaccurate. The various items I checked all had wrong page numbers, which is hardly what one would expect from Cambridge University Press.

Robin Holliday

Molecular Biology of Development

Edited by E.H. Davidson and R.A. Firtel

Alan R. Liss; New York, 1984

xxv + 685 pages. £73.00

The UCLA Symposia on Molecular and Cellular Biology enjoy a high reputation both for their scientific content as well as for their mountainous settings and the skiing they offer to the participant. This book is an account of one of these symposia held in March 1984.

There are 48 articles encompassing a wide range of developmental processes in a variety of organisms currently popular with developmental biologists. In the preface, the editors say that they have tried to avoid "either narrow topical coverage or more limited perspectives" and that they were particularly pleased with "the melding of knowledge joined by the disparate disciplines of genetics, cytology and molecular biology". Have they succeeded in achieving these laudable goals? The answer is a qualified yes.

The book is divided into seven unequal sections with unavoidable overlap among some. The first is an awkward collection of five articles on tenuously connected topics under the heading of "Cytoplasmic Localizations and Pattern Formation", although the first paper on homeotic genes perhaps illustrates better than any other the impact of modern molecular biology on developmental biology. The second and third sections make up the bulk of this book with no less than thirty articles, mostly dealing with expression of genes during oogenesis and in early (or moderately early) development. The structure and function of many of these genes have been intensively investigated in the last decade, such as those encoding globin and actin. The extensive coverage of these two sections highlights the almost total omission of genes regulated in terminally differentiated cells, such as genes coding for egg proteins, stress proteins and viral genes such as mouse mammary tumour virus. The last section is most topical in covering transformation in whole organisms and cells but surprisingly does not include the recent dramatic findings of tissue-specific and developmentally regulated gene expression in transgenic mice. Except for the seven articles on *Dictyostelium*, which perhaps reflect the bias of one of the editors, the organisms whose developments have been described reflect accurately those that enjoy wide popularity, such as *Xenopus, Drosophila*, mouse and sea urchin.

Despite the above criticisms, there is much to commend in this book which should satisfy a wide range of interests. First, the high quality of many articles, which is a reflection of the judicious choice of the invited participants by Davidson and Firtel. Second, it demonstrates how the advent of recombinant DNA will one day help the modern developmental biologist realise his dream of